



# Nuclear Power 2010

Office of Nuclear Energy  
U. S. Department of Energy

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## Nuclear Power 2010 — Overview

New baseload nuclear generating capacity is required to support the *National Energy Policy (NEP)* objectives of enhancing U.S. energy supply diversity and energy security. The Nuclear Power 2010 program, begun in 2002, is a joint government/industry cost-shared effort to identify sites for new nuclear power plants, develop and bring to market advanced nuclear plant technologies, evaluate the business case for building new nuclear power plants, and demonstrate untested regulatory processes. Accomplishing these key program objectives paves the way for an industry decision to build new advanced light-water reactor nuclear plants in the United States that would begin operation by the middle of the next decade. The Department is actively engaged with the industry to address the issues affecting future expansion of nuclear generation. The Nuclear Power 2010 program is based on expert industry recommendations documented in *A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010* and the *Business Case for New Nuclear Power Plants in the United States*.

## Background

Electricity demand in the United States is expected to grow sharply in the 21st century requiring new generation capacity. Energy Information Administration projections indicate that the country will need in excess of 345 gigawatts of new generating capacity by 2030. These projections could go higher if electricity demand continues to grow at the rates experienced in recent years. This growth would require building a significant number of new power plants over the next two decades.

The *NEP* has recommended maintaining and possibly expanding the role of nuclear energy as a major component of our Nation's energy picture. Today, nuclear power plants generate 20 percent of the electricity produced in this country. To maintain the current 20 percent share, we will need to bring on line new nuclear plants at a rate of 3 to 4 per year starting in 2015. Despite the excellent performance of current nuclear power plants, no new plant has been ordered in this country for more than 25 years, although power plant owners have been obtaining license renewal and electrical power output increases. Recent new electrical generating stations have been fueled primarily by natural gas and new stations are expected to continue to be fueled by natural gas. Over reliance on a single fuel source, like natural gas, is a potential vulnerability to the long-term security of our Nation's energy supply. Bringing new nuclear plants into operation will reduce this vulnerability, address increasing concerns over air quality, and ease the pressure on natural gas supply as well.

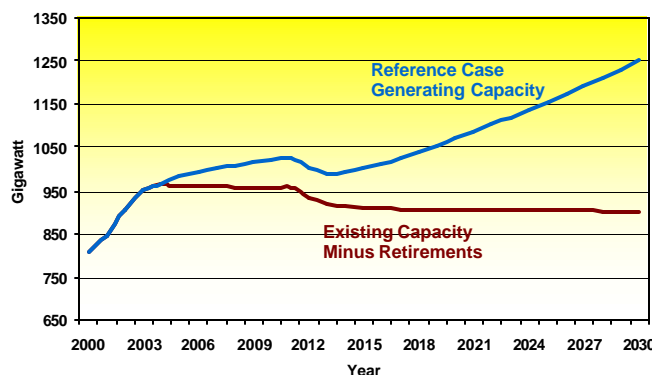
Finally, the publication by the University of Chicago titled, *The Economic Future of Nuclear Power*, shows great promise for the future of nuclear power. The principal findings of the Chicago study demonstrate that future nuclear power plants in the United States can be competitive with coal and gas-fired technologies.

## Program Activities for the Deployment of Nuclear Power

The Nuclear Power 2010 program is focused on reducing the technical, regulatory, and institutional barriers to deployment of new nuclear power plants. The technology focus of the Nuclear Power 2010 program is on Generation III+ advanced, light water reactor designs, which offer advancements in safety and economics over current nuclear plant designs and the nuclear plant designs certified by NRC in the 1990s.

To enable the deployment of new Generation III+ nuclear power plants in the United States in the relatively near-term, it is essential to complete first-of-a-kind Generation III+ reactor technology development and to demonstrate the untested Federal regulatory processes for the siting, construction, and operation of new nuclear plants. One process, the Early Site Permit (ESP), is a licensing process to approve sites for new nuclear plants prior to a power company commitment to build. The other process, the combined Construction and Operating License (COL), is a "one-step" licensing process by which nuclear

Future Need for Additional Electrical Generation Capacity



Source: Energy Information Agency, Annual Energy Outlook, 2006, Table 9

plant public health and safety concerns are resolved, and NRC approves and issues a license to build and operate a new nuclear power plant prior to commencement of construction. The Department shares the cost of program activities in cooperation with industry.

In 2003, the Department initiated cooperative projects with industry to obtain NRC approval of three sites for construction of new nuclear power plants under the NRC's ESP process, and three ESP applications were submitted by power companies to the NRC for review and approval.

In FY 2005, the Department, in cooperation with industry teams, initiated two New Nuclear Plant Licensing Demonstration Projects to demonstrate the licensing process to build and operate new nuclear power plants, and complete the design certification and development of Generation III+ reactor technologies. These industry consortia will develop and submit to the NRC COL applications for the Westinghouse Advanced Passive Pressurized Water Reactor (AP-1000) and the General Electric (GE) Economic Simplified Boiling Water Reactor (ESBWR) technologies. The two industry consortia involve power companies currently operating over two-thirds of the U.S. nuclear power plants.

#### **Standby Support for Certain Nuclear Plant Delays**

To mitigate some of the financial risk associated with new nuclear power plants, thus encouraging the construction of new nuclear plants in this country, Title VI, Section 638, "Standby Support for Certain Nuclear Plant Delays," of the Energy Policy Act (EPACT) of 2005 allows the Secretary to pay certain costs to project sponsors if construction or full power operation of an advanced nuclear facility is delayed. The standby support provision covers costs attributed to either regulatory delays or litigation that delays full-power operation of these new nuclear plants. The Secretary is permitted to pay the delay costs for a total of six reactors up to certain limits. In executing this provision, the Department will issue a final rule and develop guidelines for granting standby support coverage.

#### **FY 2006 Planned Accomplishments**

- Complete a nuclear power plant construction infrastructure assessment to independently evaluate the infrastructure to support the near-term deployment of new plants in the U.S., to compare resource requirements to current capabilities of vendors, manufacturers, regulators, suppliers, fabricators, etc., to identify insufficient resources or deficiencies.

- Continue the ESP demonstration projects by supporting resolution of site-specific issues arising from the NRC review of three ESP applications. Final NRC Safety Evaluation Reports issued as NUREGs and Environmental Impact Statements are projected to be completed in FY 2006.
- Issue an NRC reviewed nuclear industry guidance document for preparation of COL applications.
- Continue the implementation phase of the two New Nuclear Plant Licensing Demonstration Projects awarded in FY 2005.
- Receive NRC acceptance of the GE ESBWR Design Certification application for review and issuance of a draft SER for the design. Continue support for the NRC review of the GE ESBWR Design Certification application.
- Receive NRC certification of the Westinghouse AP-1000 reactor technology.
- Issue a notice of final rulemaking regulating standby support contracts in accordance with EPACT of 2005.

#### **FY 2007 Planned Accomplishments**

- Obtain NRC Early Site Permits approving three commercial nuclear plant sites in Virginia, Illinois, and Mississippi for building new nuclear power plants.
- Complete engineering and licensing activities required to prepare the first COL application.
- Develop criteria under which the Department would accept and approve applications for agreements between the Department and project sponsors that will convert to standby support contracts once plant construction has commenced.

<b>Program Budget</b> <b>Nuclear Power 2010</b> (\$ in Millions)	
FY 2006	FY 2007
<u>Adj. Approp.</u>	<u>Request</u>
\$65.3	\$54.0

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